

ABSTRACT OF THE DISCLOSURE

A magnetic sensing element includes a laminate, the laminate including a first antiferromagnetic layer; a pinned magnetic layer, the magnetization direction thereof being pinned by the first antiferromagnetic layer; a nonmagnetic conductive layer; a free magnetic layer, the magnetization direction thereof being variable in response to an external magnetic field; a nonmagnetic interlayer; a ferromagnetic layer; and a second antiferromagnetic layer. The laminate has a recess extending through the second antiferromagnetic layer and the ferromagnetic layer, a bottom face of the recess lying in the nonmagnetic interlayer, the width of the bottom face in a track width direction being equal to a track width. The free magnetic layer is magnetized in a direction substantially orthogonal to the magnetization direction of the pinned magnetic layer as a result of magnetic coupling with the ferromagnetic layer. A method for making such a magnetic sensing element is also disclosed.

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